REMARKS

In response to the Official Action mailed on June 15, 2004, the application has been amended to cancel certain claims as unnecessary and to correct a typographical error in claim 6. No new matter has been added. Reconsideration of the rejections of the claims is respectfully requested in view of the above amendments and the following remarks.

Rejection 1

On page 2 of the Official Action, claims 1 - 2 were rejected under 35 USC 103 as unpatentable over Nagai et al (U.S. Patent No. 5,817,194, referred to below as Nagai) or Sato et al (U.S. Patent No. 6,517,602, referred to below as Sato). Claims 1 and 2 have been cancelled, so this rejection is now moot.

Rejection 2

On page 3 of the Official Action, claims 3 - 4 were rejected under 35 USC 103(a) as unpatentable over Nagai or Sato and further in view of JP 06-269983 or JP 11-216591. This rejection is respectfully traversed because there is no motivation in the references to combine them in the manner proposed in the Official Action.

Nagai discloses a tin-based soldering/brazing material which, according to column 2, line 60, may be in the form of solder balls. The material is comprised of P, Ni, Cu, Ag, and a balance of Sn. Nagai does not teach any composition including

Co.

Sato discloses a variety of solder compositions for solder balls, among which are compositions which may include Ni, but there is no disclosure of any composition including Co.

JP 06-269983 discloses a solder containing Ag, Cu, Pd, and at least one of Fe, Co, and Ni, while JP 11-216591 discloses a solder product which contains at least one of Co, Fe, Mn, Cr, and Pd for the purpose of preventing diffusion of a conductor into molten solder and preventing electrode corrosion.

The Official Action relies upon the two Japanese references as supposedly teaching the interchangeability of Fe, Ni, and Co and states that it would have therefore been obvious to have replaced Ni in the composition of Nagai or Sato by Co.

The error in this argument is that neither of the secondary references teaches anything about solder balls. There is nothing in these references which suggests to a person skilled in the art that whatever effects Fe, Co, or Ni have in the solders of the secondary references have any applicability to solder balls, or that Fe, Ni, or Co have the same effects in solder balls as they provide in the secondary references. Furthermore, JP 11-216591 does not even include any compositions including Ni, so there is nothing in this reference to suggest that Co and Ni are interchangeable, either in solder balls or in other applications.

Thus, neither of the secondary references provides any motivation to a person skilled in the art to modify either of the primary references to replace Ni by Co in a solder ball in the manner proposed by the Official Action. As such, the grounds of rejection fail to set forth a *prima facie* case of obviousness. Claims 3 and 4 are therefore allowable.

Rejection 3

On page 4 of the Official Action, claims 5 - 10 were rejected under 35 USC 103(a) as unpatentable over Nagai or Sato and further in view of JP 06-269983 or JP 11-216591 as applied to claims 1 - 4 and further in view of statements on page 1 of the present application. Claims 5, 7, and 9 have been cancelled, so the rejection of these claims is now moot. The rejection of claims 6, 8, and 10 is respectfully traversed because the cited references provide no motivation to combine them as proposed in the Official Action.

The Official Action proposes to combine Nagai or Sato with JP 06-269983 or JP 11-216591 in the same manner as proposed with respect to Rejection 2, and to further modify the combined references to use the solder balls resulting from the combination to form solder bumps, since page 1 of the present application discloses that it is known to form solder bumps from solder balls.

Like Rejection 2, this rejection is premised on combining the primary references (Nagai or Sato) with the Japanese secondary references (JP 06-269983 or JP 11-216591). As set forth above with respect to Rejection 2, there is no motivation in any of these references to combine them in the manner proposed in the Official Action. Namely, there is no motivation in the references to modify either Nagai or Sato to employ Co in a solder ball. Further adding the teachings of page 1 of the present application to these references does not make up for the lack of motivation to combine the primary and secondary references. Thus, since there is no motivation to combine these references, the entire rejection is unreasonable, and the grounds of rejection do not establish a *prima facie* case of obviousness. Claims 6, 8, and 10 are therefore allowable.

Rejections 4 and 5

On page 5 of the Official Action, claims 1 - 4 were rejected under 35 USC 103 as unpatentable over JP 55-020403 in view of Nagai.

On the same page, claims 1 and 3 were rejected under 35 USC 103 as unpatentable over EP 1213089, JP 06-269983, or JP 11-216591 in view of Nagai.

Since these two rejections are similar, they will be discussed together. Both of these rejections are traversed because there is no motivation in the references to combine them in the manner proposed by the Official Action.

The basis of these rejections, according to the Official Action, is that "Nagai in col. 1, lines 5 - 13 discloses the solders of cited references can be used for brazing or soldering. The solder can be used in BGA and CSP in manufacturing semiconductor packages". It is respectfully submitted that this statement is inaccurate. Nagai teaches that the solder/brazing composition **taught in Nagai** can be used to form solder balls, but the composition taught in Nagai is not the same as the composition taught by the primary references, and there is nothing in Nagai to suggest that the compositions of the primary references can be used as solder balls. Specifically, the composition taught by Nagai is one containing P, Ni, Cu, Ag, and Sn. In contrast, the composition disclosed by JP 55-020403 is an Au-Sn based alloy for brazing a portable watch. This reference contains no teaching that its alloy is capable of being used as a solder ball, and Nagai teaches nothing about an Au-Sn based alloy. EP 1213089 discloses an alloy consisting essentially of Ag, Cu, Co, and Sn, which makes it quite different from the composition taught by Nagai, in which P and Ni are essential elements. JP 06-269983 teaches a material containing Ag, Cu, and Pd as essential elements and at least one of Fe, Co, and Ni, so it, too, is not the same material at all as the composition taught by Nagai. JP 11-216591 teaches a material containing at least one of Co, Fe, Mn, Cr, and Pd, and at least one of Ag, Cu, and Sb. It contains neither Ni nor P, whereas both of these are essential elements of Nagai, thus making the compositions of JP 11-216591 and Nagai totally different from each other.

Accordingly, since the compositions of the primary references are completely different from the composition of Nagai, the fact that the composition of Nagai may be suitable for use as a solder ball does not teach that the compositions of the primary references are suitable for use as solder balls, and thus Nagai provides no motivation to a person skilled in the art to form the compositions of the primary references into solder balls. Since there is no motivation to combine the references as proposed by the Official Action, the grounds of rejection of Rejections 4 and 5 fail to set forth a *prima facie* case of obviousness and so are improper. Claims 3 and 4 are thus allowable. Claims 1 and 2 have been cancelled, so their rejections have been mooted.

Rejection 6

On page 5 of the Official Action, claims 1 and 2 were rejected under 35 USC 103 as unpatentable over Yamashita et al (U.S. Patent No. 6,179,935, referred to below as Yamashita) in view of Nagai. Claims 1 and 2 have been cancelled, so this rejection is now moot.

New claims 11 and 12 describe additional features of the present invention. These claims are allowable as depending from claim 3. Claim 11 excludes the presence of Au (an essential component of the composition taught by JP 55-020403) or Pd (an essential component of the composition taught by JP 06-269983), which would materially affect the basic and novel characteristics of the invention defined by claim 11.

In light of the foregoing remarks, it is believed that the present application is in condition for allowance. Favorable consideration is respectfully requested.

Respectfully submitted,

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